

# **Appendix A**

## **Dissolved Oxygen Data**

Table A.1. Summary statistics of dissolved oxygen values observed at each freshwater site in the Terrebonne Basin between 2005 and 2007.

Site	Date	Daily Mean Range (mg/L)	Monthly Mean (mg/L)	Seasonal Mean DO (mg/L)	Seasonal Low (mg/L)
C-1	August 2005	5.0 - 6.9	6.02	6.02	2.43
	January 2006	7.4 - 8.2	7.72		
	April 2006	4.1 - 5.0	4.51	5.99	6.76
	August 2006	3.9 - 6.4	5.70	5.70	2.82
C-2	August 2005	4.5 - 8.6	6.66	6.66	0.13
	January 2006	8.7 - 9.1	8.96		
	April 2006	5.8 - 8.6	6.99	7.99	5.07
	August 2006	2.7 - 3.9	3.32	3.32	1.46
C-3	August 2005	3.0 - 5.5	4.19	4.19	1.96
	January 2006	7.9 - 8.1	8.01		
	April 2006	5.1 - 8.3	6.98	7.49	3.56
	August 2006	3.6 - 5.9	4.60	4.60	2.69
C-4	August 2005	4.0 - 4.8	4.40	4.40	1.56
	January 2006	7.4 - 9.2	8.18		
	April 2006	6.5 - 8.8	7.72	7.95	4.88
	August 2006	2.6 - 3.7	3.14	3.14	1.36
C-5	August 2005	3.9 - 4.9	4.40	4.40	2.90
	January 2006	9.5 - 10.7	9.89		
	April 2006	8.1 - 9.4	8.77	9.28	6.82
	August 2006	3.1 - 4.1	3.57	3.57	2.40
Site 2750	May 2005	7.0 - 8.5	7.51	7.51	5.40
	February 2006	8.1 - 9.6	9.22	9.22	6.70
	June 2006	4.3 - 7.0	5.81	5.81	2.40
	April 2007	7.3 - 9.5	8.13	8.13	6.24
	May 2007	4.1 - 4.2	4.12		
	June 2007	3.9	3.94		
	July 2007	4.1 - 5.2	4.52	4.22	1.34
	August 2007	3.5 - 6.3	4.70		
	September 2007	2.7 - 5.1	3.50		
Site 998	May 2005	4.0 - 7.1	4.71		
	August 2005	3.5 - 4.1	3.98	4.35	1.30
	March 2006	9.3 - 10.9	10.37	10.37	8.40
	June 2006	3.3 - 6.2	4.94	4.94	1.80
	April 2007	6.7 - 8.0	7.32	7.32	5.61
	May 2007	4.0 - 4.8	4.14		
	July 2007	2.9 - 3.9	3.55	4.00	1.14
	September 2007	3.5 - 5.6	4.32		
Site 3082	May 2005	5.9 - 8.2	6.62		
	August 2005	5.4 - 6.0	5.87	6.28	2.80
	March 2006	8.1 - 11.5	9.94	9.94	7.60
	June 2006	7.7 - 11.3	9.83	9.83	4.80
	April 2007	6.4 - 8.3	7.37	7.37	4.40
	May 2007	4.3 - 5.2	4.78		
	July 2007	3.9 - 5.1	4.88	4.12	1.02
	September 2007	2.3 - 3.4	2.68		
Site 3081	May 2005	6.4 - 6.8	6.65		
	August 2005	2.5 - 3.9	2.99	4.93	1.40
	February 2006	7.9 - 9.0	8.34	8.34	7.60
	June 2006	5.4 - 7.4	6.50	6.50	5.00
	April 2007	7.0 - 7.4	7.30	7.30	6.89
	July 2007	4.7 - 5.5	4.89		
	September 2007	4.5 - 5.2	4.80	4.85	3.72

Table A.2. Summary statistics of dissolved oxygen values observed at each mixed salinity site in the Terrebonne Basin between 2005 and 2007.

Site	Date	Daily Mean Range (mg/L)	Monthly Mean (mg/L)	Seasonal Mean DO (mg/L)	Seasonal Low (mg/L)
C-6	August 2005	3.1 - 7.3	4.85	4.85	1.88
	January 2006	5.3 - 7.8	5.92	6.24	3.11
	April 2006	5.1 - 11.0	6.50		
	August 2006	1.9 - 6.7	4.15	4.15	1.08
C-7	August 2005	3.4 - 4.2	3.78	3.78	1.01
	January 2006	10.0 - 10.4	10.15	8.85	4.77
	April 2006	7.1 - 8.2	7.66		
	August 2006	1.7 - 5.0	3.95	3.95	0.92
C-8	August 2005	3.5 - 5.4	4.37	4.37	0.76
	January 2006	3.1 - 4.5	3.91	3.94	1.40
	April 2006	2.3 - 6.6	3.96		
	August 2006	3.1 - 6.0	5.01	5.01	1.59
C-9	August 2005	4.3 - 6.2	5.91	5.91	0.43
	January 2006	9.6 - 10.0	9.79	8.41	5.20
	April 2006	6.1 - 8.0	7.04		
	August 2006	3.3 - 8.2	6.33	6.33	2.56
C-10	August 2005	8.4 - 9.3	8.71	8.71	4.90
	January 2006	6.5 - 7.8	7.42	6.68	3.41
	April 2006	5.5 - 7.4	6.18		
	August 2006	1.2 - 5.1	3.18	3.18	0.84
Site 3079	May 2005	7.6 - 10.2	8.57	5.84	0.60
	August 2005	1.1 - 3.1	2.58		
	March 2006	6.4 - 8.4	7.32	7.32	4.10
	June 2006	8.3 - 10.6	9.71	9.71	6.50
	April 2007	11.7 - 15.7	12.47	12.47	6.75
	July 2007	5.8 - 11.0	8.40	7.92	4.12
Site 588	September 2007	7.0 - 8.2	7.45		
	May 2005	6.8 - 10.0	8.29	6.31	0.50
	August 2005	3.2 - 8.0	5.54		
	February 2006	9.2 - 10.6	10.04	10.04	0.40
	July 2006	9.3 - 11.6	10.36	10.36	5.40
	April 2007	13.2 - 14.3	13.78	13.78	10.26
	May 2007	7.3 - 8.8	7.65		
	June 2007	7.7 - 9.3	8.19	7.32	2.75
Site 3111	September 2007	5.0 - 7.1	6.12		
	August 2005	2.4 - 11.2	5.59	5.59	1.60
	February 2006	8.5 - 11.2	10.23	10.23	8.40
	June 2006	2.6 - 4.9	3.82	3.82	1.30
	April 2007	10.3 - 13.3	10.88	10.88	7.96
	May 2007	6.0 - 8.3	7.15		
	July 2007	3.6 - 10.1	6.33	6.70	1.82
Site 3113	September 2007	5.2 - 7.5	6.63		
	August 2005	4.2 - 8.8	7.10	7.10	2.40
	March 2006	8.7 - 10.7	9.85	9.85	7.90
	July 2006	6.2 - 12.5	9.78	9.78	4.70
	April 2007	14.5	14.52	14.52	11.02
	May 2007	6.3 - 15.0	9.05		
	June 2007	4.9 - 7.0	5.70	7.85	2.73
	September 2007	6.5 - 10.2	7.97		

Table A.3. Summary statistics of dissolved oxygen values observed at each saltwater site in the Terrebonne Basin between 2005 and 2007.

Site	Date	Daily Mean Range (mg/L)	Monthly Mean (mg/L)	Seasonal Mean DO (mg/L)	Seasonal Low (mg/L)
C-11	August 2005	6.6 - 8.1	7.79	7.79	4.44
	January 2006	8.4 - 9.4	8.92	7.64	5.70
	April 2006	6.5 - 7.0	6.67		
	August 2006	4.8 - 6.5	5.27	5.27	2.99
C-12	August 2005	1.3 - 9.7	3.17	3.17	0.09
	January 2006	7.0 - 7.9	7.40	7.28	5.90
	April 2006	6.9 - 7.5	7.19		
	July 2006	6.1	6.14	5.46	3.01
	August 2006	4.5 - 5.5	5.17		
C-13	August 2005	6.5 - 7.6	7.24	7.24	3.04
	January 2006	7.1 - 7.4	7.33	6.72	4.12
	April 2006	5.7 - 7.8	6.19		
	August 2006	3.9 - 6.8	4.79	4.79	1.61
C-14	August 2005	7.4 - 9.4	8.59	8.59	5.92
	January 2006	8.8 - 10.1	9.55	8.37	5.76
	April 2006	6.3 - 7.3	6.70		
	July 2006	8.2	8.20	6.83	3.10
	August 2006	5.3 - 6.8	6.55		
C-15	August 2005	7.7 - 14.7	11.88	11.88	2.32
	January 2006	7.9 - 8.5	8.77	7.80	4.04
	April 2006	6.0 - 7.8	6.49		
	July 2006	6.9	6.91	5.51	3.43
	August 2006	4.5 - 5.4	5.06		
Site 3087	June 2005	4.3 - 6.0	5.31	5.56	2.20
	August 2005	4.5 - 8.1	5.84		
	March 2006	7.0 - 8.9	7.73	7.73	5.90
	June 2006	6.0 - 7.2	6.77	6.77	5.30
	April 2007	7.9 - 9.3	8.74	8.74	7.68
	May 2007	6.9 - 7.8	7.29		
	July 2007	6.2 - 7.7	6.87	6.95	5.49
	October 2007	6.3 - 7.2	6.71		

# **Appendix B**

## **Regression Analyses of Fish and Dissolved Oxygen Data**

Table B.1. Results of simple linear regression analyses of various fish community indices and dissolved oxygen (DO) measures collected from freshwater areas of the Terrebonne Basin. Slope and  $r^2$  values are presented for each species index vs. DO relationship.

	Species Richness		Total Abundance		% Tolerant Species		% Omnivore	
	Slope	$r^2$	Slope	$r^2$	Slope	$r^2$	Slope	$r^2$
<b>Low Daily Mean DO (mg/L)</b>	-0.0458	0.269	-0.0037	0.1122	-0.0069	0.0036	0.0252	0.0616
<b>Monthly Mean DO (mg/L)</b>								
August 2005	0.1735	0.2294	-0.0028	0.0124	-0.2406	0.2742	-0.1202	0.2741
January 2006	0.0114	0.0016	0.0007	0.0012	-0.0302	0.0071	-0.0151	0.0071
April 2006	0.0299	0.0035	0.0085	0.0594	-0.0076	0.0001	-0.0039	0.0001
August 2006	-0.2014	0.3404	-0.0121	0.2546	0.2253	0.2649	0.1126	0.2652
<b>Seasonal Low DO (mg/L)</b>								
Summer 2005	0.1705	0.2722	0.0078	0.6609	0.3785	0.7769	0.2183	0.3377
Summer 2006	-0.0377	0.1041	0.00006	0.0003	0.0895	0.3398	0.1116	0.6907

Table B.2. Results of simple linear regression analyses of various fish community indices and dissolved oxygen (DO) measures collected from mixed salinity areas of the Terrebonne Basin. Slope and  $r^2$  values are presented for each species index vs. DO relationship.

	Species Richness		Total Abundance		% Tolerant Species		% Omnivore	
	Slope	$r^2$	Slope	$r^2$	Slope	$r^2$	Slope	$r^2$
<b>Low Daily Mean DO (mg/L)</b>	-0.1232	0.2212	-0.0078	0.043	-0.1969	0.8407	-0.0368	0.0451
<b>Monthly Mean DO (mg/L)</b>								
August 2005	-0.4037	0.3719	-0.018	0.0357	0.0599	0.0122	0.3058	0.4883
January 2006	-0.34	0.1459	-0.0613	0.2289	-0.3523	0.233	-0.3157	0.2878
April 2006	-0.1654	0.12	-0.0046	0.0046	-0.0961	0.0603	-0.12	0.1445
August 2006	-0.1767	0.1882	-0.0148	0.0641	-0.3075	0.8474	-0.068	0.0638
<b>Seasonal Low DO (mg/L)</b>								
Summer 2005	-0.3439	0.3743	-0.0097	0.0145	0.0731	0.0251	0.2469	0.4413
Summer 2006	-0.1422	0.3469	-0.0115	0.1097	-0.186	0.8832	-0.0195	0.0149

Table B.3. Results of simple linear regression analyses of various fish community indices and dissolved oxygen (DO) measures collected from both freshwater and mixed salinity areas of the Terrebonne Basin. Slope and  $r^2$  values are presented for each species index vs. DO relationship.

	Species Richness		Total Abundance		% Tolerant Species		% Omnivore	
	Slope	$r^2$	Slope	$r^2$	Slope	$r^2$	Slope	$r^2$
<b>Low Daily Mean DO(mg/L)</b>	-0.0239	0.0259	-0.00001	0.000003	-0.0006	0.00001	0.0489	0.1068
<b>Monthly Mean DO(mg/L)</b>								
August 2005	-0.0932	0.0309	-0.0049	0.0113	-0.0593	0.0162	0.0353	0.0136
January 2006	-0.169	0.0626	-0.0112	0.0366	-0.1153	0.0378	-0.062	0.0258
April 2006	-0.0719	0.0201	0.0054	0.0148	0.005	0.0001	-0.0094	0.0011
August 2006	-0.1825	0.2256	-0.0119	0.1281	-0.1444	0.1905	0.0033	0.0002
<b>Seasonal Low DO (mg/L)</b>								
Summer 2005	0.0716	0.0358	0.0073	0.3622	0.2029	0.2864	0.1764	0.3065
Summer 2006	-0.0391	0.0494	0.0008	0.0184	0.0378	0.045	0.0821	0.3156

Table B.4. Results of simple linear regression analyses of various fish community indices and dissolved oxygen (DO) measures collected from salt water areas of the Terrebonne Basin. Slope and  $r^2$  values are presented for each species index vs. DO relationship.

	Species Richness		Total Abundance	
	Slope	$r^2$	Slope	$r^2$
<b>Low Daily Mean DO(mg/L)</b>	-0.2964	0.7255	-0.0016	0.2856
<b>Monthly Mean DO(mg/L)</b>				
August 2005	-0.5227	0.5804	-0.0043	0.5121
January 2006	-0.1839	0.7206	-0.0012	0.4011
April 2006	0.0262	0.1056	0.0001	0.0242
August 2006	-0.0473	0.0978	0.00003	0.0004
<b>Seasonal Low DO(mg/L)</b>				
Summer 2005	-0.3403	0.4943	-0.0012	0.0734
Summer 2006	-0.0691	0.1998	-0.0008	0.3823

## **Appendix C**

### **10<sup>th</sup> Percentile Dissolved Oxygen Estimates**



## 10<sup>th</sup> Percentile Dissolved Oxygen Estimates

The primary methods used for calculating the different dissolved oxygen (D.O.) criteria evaluated in this report were based upon the 10<sup>th</sup> percentile of minimum daily D.O. values observed in the Terrebonne Basin. The minimum daily D.O. values were selected from continuous monitoring records that typically included 96 records during a 24 hour period (i.e., data collected at 15 minute intervals). The analysis presented here was completed to evaluate the 10<sup>th</sup> percentile of the entire observed D.O. distribution and not just the distribution of minimum daily values.

As with the 10<sup>th</sup> percentile analyses of the daily minimum D.O. values, the 10<sup>th</sup> percentile of the entire D.O. distribution for each salinity class was calculated for each season (May through October or November through April). The data set and site divisions used in this analysis were identical to those described in Section 2.1. Unlike the analysis of the 10<sup>th</sup> percentile of the minimum daily D.O. distribution values, no confidence limits were calculated for the 10<sup>th</sup> percentile estimates of the entire D.O. distribution.

Table C.1 presents the estimates of the 10<sup>th</sup> percentile of all observed D.O. values for both summer and winter seasons for freshwater, mixed salinity, and saltwater zones. As with other analysis, the concentrations observed during the winter period are higher than those observed during summer periods. Also, based on these analyses, the 10<sup>th</sup> percentile of the D.O. distribution is below the current Louisiana criteria in all three areas during the summer period, but only below the applicable criteria in the freshwater areas during the winter period.

Table C.1. Summary of the estimates of the 10<sup>th</sup> percentile of the entire distribution of observed dissolved oxygen (mg/L) values for each area of the Terrebonne Basin, Louisiana.

	<b>Freshwater</b>	<b>Mixed Salinity</b>	<b>Saltwater</b>
Summer Season (May through October)	2.82	2.74	3.70
Winter Season (November through April)	3.70	4.34	6.13